Diagnostic Filters for Exoplanets and Brown Dwarfs from 1–5 μm

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We have undertaken a study of theoretical spectra from 1–5 μm to define a set of filters that are diagnostic of temperature and surface gravity for brown dwarfs and exoplanets over a wide range of masses and ages. The current results are based on the models of *Burrows, Sudarsky, and Lunine* (2003). While the discovery of such objects is on-going, surveys are being undertaken to characterize their frequency and physical properties. In this context, the optimum design of such diagnostic filters is important for efficiently characterizing the nature of objects with known distance as well as identifying foreground/background objects in cluster studies. Our analysis compares the results of simulating color/color and color/magnitude diagrams for three different upcoming thermal infrared instruments; Clio on the MMT, NIRCam on JWST, and possible thermal IR imaging coronographs for the Giant Magellan Telescope. The appropriate noise sources are included for each instrument to assess the ability of each to characterize samples of varying distances and ages.

[a] Burrows, A., Sudarsky, D., and Lunine, J., Beyond the T Dwarfs: Theoretical Spectra, Colors, and Detectability of the Coolest Brown Dwarfs, *ApJ*, **596**, 587–596, 2003.